

CLAIMS

What is claimed is:

1. A display device, comprising:
 - a plurality of light emitters, each of said
 - 5 light emitters emitting a light different in color from other of said light emitters;
 - a power source for supplying power to said light emitters; and
 - a controller for controlling a current flowing
 - 10 through at least one of said light emitters such that a sum of currents flowing through said light emitters is maintained at a predetermined value.
2. The display device as claimed in claim 1, wherein at least one of said light emitters is a
- 15 light emission diode.
3. The display device as claimed in claim 2, wherein said light emission diode emits one of red color light, green color light and blue color light.
4. The display device as claimed in claim 1,
- 20 wherein right-direction voltage drops across said light emitters are set to be substantially equal to each other whereby the sum of currents flowing through said light emitters is maintained at the predetermined value.
- 25 5. The display device as claimed in claim 1, further comprising:

a plurality of resistors, wherein said resistors are respectively disposed between said power source and said light emitters, and a resistance value of said resistors affects the 5 current flowing through said light emitters.

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6. ~~The display device as claimed in claim 5,~~ wherein the resistance values of said resistors are set to be substantially equal to each other whereby the sum of currents flowing through said light 10 emitters is maintained at the predetermined value.

7. The display device as claimed in claim 1, wherein said controller controls the current flowing through said at least one of said light emitters, whereby the currents do not simultaneously flow 15 through the plurality of said light emitters.

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8. ~~The display device as claimed in claim 1,~~ wherein said controller includes:

a plurality of switches respectively connected to said light emitters, for individually controlling 20 whether or not the currents are flowing through said light emitters connected thereto; and

a plurality of control signal generators for respectively generating a control signal to said 25 switches.

9. The display device as claimed in claim 8, wherein one of said switches includes a field effect

transistor.

10. The display device as claimed in claim 8, wherein said controller assigns duty values to said control signal generators.

5 11. The display device as claimed in claim 10, wherein said control signal generators generate the control signals having pulse widths which are based on the duty values assigned by said controller.

10 12. The display device as claimed in claim 10, wherein a sum of the duty values assigned to said control signal generators is a constant.

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15 13. The display device as claimed in claim 1, further comprising:
~~a converter for adjusting the power supplied to said light emitters from said power source.~~

20 14. The display device as claimed in claim 13, wherein said converter increases the power supplied from said power source to increase a brightness of the light emitted from said light emitters.

25 15. The display device as claimed in claim 13, wherein said converter decreases the power supplied from said power source to decrease a brightness of the light emitted from

said light emitters.

16. A portable electronic device having a display device, said portable electronic device comprising:
- 5 a first light emitter for emitting a first color light;
- a second light emitter for emitting a second color light which is deferent from the first color light;
- 10 a third light emitter for emitting a third color light which is deferent from the first color light and the second color light, whereby images of a forth color are adapted to be displayed in cooperation with said first light emitter and said
- 15 second light emitter;
- a power source for supplying voltage to said first light emitter, said second light emitter and said third light emitter;
- a controller for controlling currents flowing
- 20 through said first light emitter, said second light emitter and said third light emitter, respectively, whereby a sum of the currents flowing through said first light emitter, said second light emitter and said third light emitter is maintained at a
- 25 predetermined current value.

17. The portable electronic

device as claimed in claim 16, wherein said first light emitter is a first light emission diode emitting a red color light, said second light emitter is a second light emission diode emitting a green color light, and said third light emitter is a third light emission diode emitting a blue color light.

18. The portable electronic device as claimed in claim 16, wherein said controller comprises:
- a first control signal generator for generating a first control signal;
 - a second control signal generator for generating a second control signal;
 - a third control signal generator for generating a third control signal;
 - a first switch for switching on said first light emitter based on the first control signal generated from said first control signal generator, thereby controlling the current flowing through said first light emitter;
 - a second switch for switching on said second light emitter based on the second control signal generated from said second control signal generator, thereby controlling the current flowing through said second light emitter; and

a third switch for switching on said third light emitter based on the third control signal generated from said third control signal generator, thereby controlling the current flowing through said 5 third light emitter.

19. The portable electronic device as claimed in claim 18, wherein one of said first switch, said second switch and said third switch has a field effect transistor.

10 20. The portable electronic device as claimed in claim 18, wherein one of said first control signal generator, said second control signal generator and said third control signal generator is a pulse width modulator.

15 21. The portable electronic device as claimed in claim 18, wherein said controller assigns a first duty value to said first control signal generator, assigns a second duty value to said second control signal generator, and 20 assigns a third duty value to said third control signal generator.

22. The portable electronic device as claimed in claim 21, wherein a pulse width of the first control signal generated from said 25 first control signal generator is based on the first duty value assigned by said controller, a pulse

width of the second control signal generated from said second control signal generator is based on the second duty value assigned by said controller, and a pulse width of the third control signal generated 5 from said third control signal generator is based on the third duty value assigned by said controller.

23. The portable electronic device as claimed in claim 16, further comprising:
- 10 a first resistor disposed between said power source and said first light emitter, for affecting the current flowing through said first light emitter;
- 15 a second resistor disposed between said power source and said second light emitter, for affecting the current flowing through said second light emitter; and
- 20 a third resistor disposed between said power source and said third light emitter, for affecting the current flowing through said third light emitter;
- wherein resistance values of said first resistor, said second resistor and said third resistor are substantially equal to a predetermined resistance value.
- 25 24. The portable electronic device as claimed in claim 23, wherein a first

right-direction voltage drop across said first light emitter, a second right-direction voltage drop across said second light emitter and a third right-direction voltage drop across said third light
5 emitter are substantially equal to a predetermined voltage value.

25. The portable electronic device as claimed in claim 24, wherein said controller assigns a first duty value to said first control signal generator, assigns a second duty value to said second control signal generator, and 10 assigns a third duty value to said third control signal generator.

26. The portable electronic device as claimed in claim 25, wherein the voltage supplied from said power source is E, the predetermined resistance value is R₀, the predetermined voltage value is V₀, the first duty value is a, the second duty value is b, and the 15 third duty value is c, and the predetermined current value I is:
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$$I = (a + b + c) \times (E - V_0) / R_0, \text{ wherein } I, a, b, c, E, V_0 \text{ and } R_0 \text{ are real numbers.}$$

27. The portable electronic device as claimed in claim 16, further comprising a 25 converter disposed between said power source and

said first light emitter, said second light emitter and said third light emitter, for adjusting the voltage supplied from said power source.

28. The portable electronic
5 device as claimed in claim 16, wherein the portable electronic device is a portable telephone.

29. A method of controlling a display device, the method comprising:
displaying an image on the display device, the
10 image having a brightness;
changing a color of the image displayed on the display device; and
maintaining the brightness of the image at a predetermined value even if the color is changed.

15 30. A method of controlling a display device, the display device having a plurality of light emitters, the method comprising:
controlling current flowing through each of the light emitters individually, whereby an image with a
20 desired color is displayed according to a light emitted from the light emitters; and
maintaining a sum of currents flowing through the light emitters at a predetermined current value, thereby maintaining a brightness of the image at a
25 predetermined brightness value.

31. The method as claimed in

claim 30, wherein at least one of the light emitters is a light emission diode.

32. The method as claimed in claim 31, wherein the light emission diode emits one of red color light, green color light and blue color light.

33. The method as claimed in claim 30, further comprising supplying voltage to the light emitters and changing the predetermined brightness value by changing the voltage supplied to the light emitters.

34. A method of controlling a portable electronic device, said device having a first light emitter for emitting a first color light, a second light emitter for emitting a second color light which is deferent from the first color light, a third light emitter for emitting a third color light which is deferent from the first color light and the second color light, whereby images with a forth color are adapted to be displayed in cooperation with the first light emitter and the second light emitter, a power source for supplying voltage to the first light emitter, the second light emitter and the third light emitter, a controller for individually controlling currents flowing through the first light emitter, the second light

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emitter and the third light emitter, the method comprising:

changing the forth color by controlling the current flowing through at least one of the first
5 light emitter, the second light emitter and the third light emitter; and

10 maintaining a sum of the currents flowing through the first light emitter, the second light emitter and the third light emitter at a predetermined current value.